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AUTHOR Straussner, Joel H.
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ABSTRACT

A study investigated the relationship among teacher problem solving style, classroom behaviors, and susceptibility to the expectancy phenomenon (the possibility that pupil classroom performance can be influenced by a teacher's attitudes, beliefs, and actions). Based on Elkind's conceptual shift experiments (1966), 12 elementary school teachers were asked to discover a relationship between 12 pairs of words and pictures. Teachers were also asked to record characteristics looked for in successful students and to rank students by these criteria. This ranking enabled two observers to record pupil-teacher classroom interactions with the Brophy-Good Dyadic Rating Scale. Results indicated that the classroom behaviors of teachers were related to their problem solving style. Teachers with a rigid problem solving style had pupil-teacher interactions that indicated a relationship to perceived differences in student abilities, while teachers with a flexible problem solving style demonstrated that their interactions with pupils were less affected by perceived differences in student abilities. The results suggest that differences in teachers' problem solving styles can be interpreted as a correlate to differences in teacher susceptibility to the expectancy phenomenon. (Author/FG)

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PROBLEM SOLVING STYLE, TEACHER CLASSROOM BEHAVIOR AND THE EXPECTANCY PHENOMENON

By

JOEL H. STRAUSSNER, Ph.D.

Copy of paper presented to the 90th Convention of the American Psychological Association in Washington on August 26, 1982

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SP 021 292

Problem Solving Style, Teacher Classroom Behavior and The Expectancy Phenomenon

by
Joel H. Straussner, Ph. D.

Abstract:

The purpose of this study was to examine how differences in teacher conceptual style affected their classroom interactions with students. Based on Elkind's conceptual shift experiments (1966), twelve teachers were asked to discover a relationship between twelve pairs of words and pictures. The expected relationship could only be found by changing an initial conceptual set. Teachers were also asked to record characteristics looked for in successful students and ranked their students by these criteria. This ranking enabled two observers to record teacher-pupil classroom interactions with the Brophy-Good Dyadic Rating Scale.

The results indicated that the classroom behaviors of teachers were related to their problem solving style. Teachers with a rigid problem solving style had pupil interactions that showed a relationship to perceived differences in student abilities while teachers with a flexible problem solving style demonstrated that their interactions with pupils were less affected by perceived differences in student abiliites. These results suggest that differences in problem solving styles can be interpreted as a correlate to differences in teacher susceptibility to the expectancy phenomenon.

Introduction and Overview

The purpose of the present investigation was to study the relationship between teacher problem solving style, classroom behaviors and susceptibility to the expectancy phenomenon which can be described as the possibility that pupil classroom performance can be influenced by a teacher's attitudes, beliefs and actions. Although the expectancy phenomenon has been intensively studied and has been verified experimentally in 84 studies (Braun, 1977), investigators have not been able to consistently demonstrate this effect and are still seeking the mechanism that might sustain it. Previous research has generally focused on the possible student characteristics that influence teacher behavior. Among the variables suggested as affecting teachers are the following: child's sex, race, I.Q., previous achievement, socio economic status, name and prior contact with older siblings.

However, pupil characteristics alone cannot account for the inconsistencies replicating this phenomenon. It has been suggested that variability in teacher characteristics and behaviors (Brophy, Everston & Good, 1973; Brophy, 1982) might result in some teachers being more susceptible to the conditions generating this phenomenon, more likely to demonstrate this behavior.

Yet, there has been little research examining whether teachers differ in their susceptibility to this phenomenon. It is only recently (Babad, Inbar, and Rosenthal, 1982) that the effect of teacher personality on their expectations for students has begun to be explored. One component of personality which might affect susceptibility to the expectancy phenomenon is teacher cognitive functioning or how teachers use and structure information. Yet there has been minimal research relating cognitive variables to differences in teacher classroom behaviors which might affect susceptibility to the expectancy phenomenon.

Review of Literature

Theoretical Background and Issues

Prior to 1968, there was no research on how teacher expectations influenced pupil performance. It is now accepted that a teacher's behavior can result in an expectancy effect when pupil performance confirms a teacher's original predictions about a student. This performance is understood to have been determined by the teacher's behavior.

With the first study on teacher expectancy (Rosenthal and Jacobson, 1968), a shift occurred in the understanding of what happens in the classroom. The results indicated that teachers generated expectations that were related to the ability levels of students and acted in ways to fulfill them. The results also implied that teachers may not have been as responsive to pupil performance as they should have been prior to their students being labelled.

Subsequent studies investigated numerous variables which may influence teacher expectations. Research can be classified into two main areas: 1) investigations of the effect of pupil intelligence on teacher expectations, 2) the effect of pupil achievement on teacher expectations and classroom behaviors.

Teacher Expectations and Pupil Intelligence

Studies on the effect of pupil intelligence on teacher expectations have consisted of labelling students as "late bloomers" (Claiborne, 1969; Michenbaum and Bowers, 1969) or designating a group as capable of showing superior ability (Smith and Lugenbuhl, 1976 - "bright vs. dull"). These studies attempted to induce a bias in the teacher towards students labelled as having some greater potential. However, an expectancy effect was not consistently demonstrated in these studies which indicates that not all teachers could be biased by arbitrary labels.

Other studies (Flemming, 1971; Rothbart, Dalfen and Barrett, 1971) were unable to demonstrate that teachers could be consistently biased to show an expectancy effect with the use of actual I.Q. scores.

Teacher Expectations and Pupil Achievement

Various studies (Jose and Cody, 1971; Seaver, Jr., 1973; Mendels and Flanders, 1973; Wilkins, 1976; Zanna, Sheras, and Cooper, 1975; Strauss and Levin, 1976; Humphry and Stubbs, 1977) have examined the effect of past and present achievement of

pupils on teacher expectations. No consistent pattern of teacher biasing in the direction of past and present high achievers was evident. To date, no pupil characteristic has been found to be consistently related to teacher susceptibility to the expectancy phenomenon.

Teacher Expectations and Teacher Cognitive Style

From the preceeding sections, it would seem logical to relate differences in teacher cognitive functioning to the expectancy phenomenon. Yet few studies have related cognitive variables to the expectancy phenomenon.

One study (Hughes, 1977) examined the relationship between rigidity of teacher expectations, classroom peer structure and climate. No significant relationship was found between rigidity of teacher expectations and structure of sociometric choices or a group affect. However, the study did find that rigid teachers tended to segregate children in their classes on the basis of ability. The author suggested that this finding may be a manifestation of larger effect that the study failed to find.

Research Design and Methodology

The Sample

The sample consisted of twelve second grade teachers and their pupils. The teachers were matched for sex, age, education and years of teaching experience. Teachers selected had up to three years of teaching experience, were 23 to 30 years old with some graduate education. Younger, less experienced teachers with the benefits of some graduate training were thought to have fewer preconceived ideas about pupil performance. On the other hand, younger teachers were also seen as being potentially more insecure, anxious and might experience greater pressure about meeting stated goals for their pupils. They might lack professional skills needed to teach difficult pupils. They might conceivably prefer their brighter students who are better able to meet their goals and may be easier to teach since they tend to be less disruptive. Thus it was felt that younger teachers might be subjected to variables that would not have affected older teachers.

This study was conducted during the Spring term in various public and private elementary schools. Implicit in this study was the assumption that teachers naturally develop criteria that help them determine what expectations they will have for a particular child. During the Spring term, in particular, teachers are thinking in terms of which students they will promote and whom

they will leave back. Consequently, they might be better able to state what criteria they are using to evaluate student performance.

Measuring Instrument: Teacher Problem Solving Style

Teachers were given a conceptual shift task. This has been developed from the work on concept attainment (Elkind, 1966). The ability to shift conceptually down and alter one's reasons to fit a changing set of circumstances resembled Luchin's experiments (1959) and can be used as a means of assessing an individual's set breaking behavior.

Measuring Instrument: Naturalistic Teacher Expectations

Teachers were asked to list at least three (or more) characteristics that they look for in successful students. The teachers then ranked the students in their classes from those that have these characteristics the most to those that have them the least. This ranking formed the basis for determining the teachers' expectations for their students. The ranking also provided a numerical index that enabled teacher-pupil interactions to be observed and recorded.

Measuring Instrument: Teacher - Pupil Interaction

Differences in classroom interaction style were measured by the Dyadic Rating Scale (Brophy and Good, 1969). This scale allows for the detailed observations of a teacher's interactions with specific pupils. It is based on the reasoning that differences in observable and measurable teacher-pupil classroom behaviors can influence the appearance of the expectancy phenomenon (Brophy and Good, 1976).

Procedure

Teachers were asked to participate in a problem solving task. They were read a set of instructions (Elkind, 1966), which required their selecting a correct word from a pair of words. Subjects were asked to verbalize a rule which guided their thinking and had up to three full trials (of 24 cards each) to do so. Observers recorded both the number of correct answers and the subject's rule guiding his answers. If the subjects failed to verbalize the correct rule after the third trial, they were considered as having a rigid problem solving style. If a subject verbalized the appropriate rule in three or less trials, then they were considered as having a flexible response style. All subjects were then given a similarity (pictures) condition with

the same procedure. However, this format presented the objects in pictorial form. Teachers were then grouped according to their conceptual style. Teachers were also asked to write down the characteristics that they look for in successful students Students were then ranked by their teachers in accordance to the teachers' perception of how well each student possessed these criteria. Teachers' classroom behaviors were then observed with students that were ranked by the teacher's criteria for success. Observations were made for a total of 2 hours per teacher. These observations consisted of a total of 1 hour per morning and afternoon sessions. Observation consisted of an early morning period for thirty minutes and a late morning observation (prior to lunch). Observations in the afternoon took place after lunch and one late afternoon period. This stratification allowed the observers to teacher student activities under a variety of conditions and during different times.

Results Section

The results section comprised an analysis of three different areas of the subjects' behaviors. The first analysis explored differences in the problem solving behaviors of adults. The second analyzed the interaction between problem solving style and teacher classroom behavior. The third analysis examined the affect of differences in problem solving styles on teachers' interactions with specific groups of students.

Adult Problem Solving Styles

From the 12 adults that were given the conceptual shift task, six adults passed both test conditions and were classified as flexible problem solvers. None of the remaining six adults passed both the verbal and picture task. These were, therefore, classified as rigid problem solvers.

To further explore differences between the two problem solving groups, means and standard deviations were calculated for the number of trials, the number of answers and the number of rules stated per conceptual level. T-tests performed on these scores revealed no significant differences on these variables. The two groups did not differ in the number of trials per task, the number of answers obtained or in the conceptual levels of the rules stated.

However, one important difference between the two problem solving groups was found (see Table 1). There is an inverse relationship between the two groups regarding the ratio for the number of rules per trial to the number of trials. This ratio could be thought of as a measure of the activity level of each problem solving group and showed how efficiently each group

Table 1

Ratio of Rules Stated to Recorded Number of Trials for Rigid and Flexible Problem Solvers

	Rigid Problem Solving Teachers	Flexible Problem Solving Teachers
Words	.69	1.00
Pictures	1.06	.93
Total	.90	.96

solved the problem. Teachers with a flexible problem solving style apparently were able to generalize from the first task and worked more efficiently at solving the second problem.

However, the rigid problem solvers gave less rules per trial on the first task (without complete success) and then gave a greater number of rules for the second task which did not help them solve the problem. Despite their increased productivity, the group of rigid problem solvers performed the task in a less efficient manner.

Teacher Classroom Behavior

In order to analyze teacher classroom behavior, information from the Dyadic Rating Scale was summed into means and standard deviations. An analysis of variance was then performed to assess the possibility of any significantly different classroom behaviors between the two teaching groups.

The Dyadic Rating Scale date was analyzed by tabulating frequency scores for each category from the recording sheets. To facilitate statistical analysis, the data was summed into six categories: questions asked or "afforded"; "simple" or direct factual questions; "elaborate" or process, choice and self referrent questions; "approval" feedback which includes affirmation and praise; "disapprove" feedback which includes negation and criticism and "other" feedback which includes a continuation of a child's response turn. Means and standard deviations which were derived for each of the three student groups (high, middle and low) from each of the two groups of problem solving teachers. These scores were then used in an analysis of variance that compared the two types teachers.

The data was then analyzed in four different ways. The first analysis (Table 2) explored absolute differences in teacher classroom behavior with different kinds of students. This analysis did not explain, however, the relationship of a given variable to either a specific group's or a teacher's activity within a class. Therefore, the data was also analyzed in terms of differences in the proportions (percents) that teachers spent with each of the three groups for each of the six variables. This consisted of a percent variable analysis or the percentage that each of the three groups received of each variable from each type of teacher (Table 3). The data was further analyzed in terms of the percent that a given variable comprised of a particular group's total classroom activity (Table 4). The last analysis consisted of the percentage of the teacher's activity that was spent on each variable with each of the three student groups (Table 5).

From the preceding analyses, it would appear that differences in teacher problem solving styles resulted in some

Table 2

Results of the Analysis of Variance
from the Rigid and Flexible Problem Solving Teachers'
Classroom Interactions with High, Middle and Low Functioning
Students: Raw Score Analysis

Variable	Rigid Problem Solvers Cell Means			Flexible Problem Solvers Cell Means			F Value	Tail Probability
	High	Mid	Low	High	Mid	Low		
Afforded	28.67	32.67	26.50	30.17	24.50	29.83	.03	.869
Simple	21.67	25.83	22.67	28.50	23.67	28.33	.41	.536
Elaborate	7.00	6.83	3.83	1.67	.83	1.50	4.36	.063
Approved	21.83	22.00	17.67	20.33	17.17	21.00	.03	.870
Disapproved	1.33	1.83	2.00	1.00	1.17	1.00	1.23	.294
Other	9.00	11.50	9.83	12.67	13.83	12.00	1.41	.262

Table 3

Results of the Analysis of Variance
from the Rigid and Flexible Problem Solving Teachers'
Classroom Interactions with High, Middle and Low Functioning
Students: Percent Variable Analysis

Variable	Rigid Problem Solvers Cell Means			Flexible Problem Solvers Cell Means			F Value	Tail Probability
	High	Mid	Low =100%=	High	Mid	Low		
Afforded	33.63	36.33	30.04	32.96	30.61	36.43	.00	1.00
Simple	30.13	36.29	33.58	32.47	31.08	36.45	.29	.608
Elaborate	42.47	36.05	21.48	60.86	13.71	25.43	1.00	.347
Approved	36.81	34.63	28.56	31.29	30.52	38.19	3.60	.094
Disapproved	22.74	50.36	26.90	46.00	34.67	19.33	.00	1.00
Other	31.45	38.55	30.00	30.39	37.42	32.18	1.80	2.17

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Table 4

Results of the Analysis of Variance
from the Rigid and Flexible Problem Solving Teachers'
Classroom Interactions with High, Middle and Low Functioning
Students: Percent Group Analysis

Variable	Rigid Problem Solvers Cell Means			Flexible Problem Solvers Cell Means			F Value	Tail Probability
	High	Mid	Low	High	Mid	Low		
Afforded	31.98	32.06	32.01	31.93	30.30	31.98	.93	.358
Simple	23.98	25.80	28.10	30.21	29.40	30.68	6.28	.031*
Elaborate	7.99	6.26	3.92	1.72	.90	1.31	6.65	.[illegible]
Approved	23.80	20.85	20.48	21.04	21.30	21.35	.06	.811
Disapproved	1.79	1.89	2.55	1.49	1.38	.95	1.28	.284
Other	10.46	13.14	12.95	13.60	16.74	13.74	1.17	.305
Total %	100%	100%	100%	100%	100%	100%		

*P∠.05

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Table 5

Results of the Analysis of Variance
from the Rigid and Flexible Problem Solving Teachers'
Classroom Interactions with High, Middle and Low Functioning
Students: Percent Total Analysis

Variable	Rigid Problem Solvers Cell Means			% Total	Flexible Problem Solvers Cell Means			% Total	F Value	Tail Probability
	High	Mid	Low		High	Mid	Low			
Off-task	10.73	11.65	9.52	31.90	11.09	9.49	10.83	31.42	.56	.471
On-task	8.11	9.25	8.38	25.73	10.53	9.22	10.33	30.09	6.03	.034*
Elaborate	2.63	2.40	1.15	6.18	.56	.27	.50	1.32	6.28	.031*
Approved	7.97	7.70	6.09	21.76	7.26	6.72	7.38	21.36	.04	.842
Disapproved	.55	.70	.78	2.03	.41	.43	.33	1.16	1.74	.217
Other	3.88	4.61	3.90	12.39	4.95	5.15	4.56	14.66	1.01	.338
				100%				100%		

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4.05

significantly different classroom behaviors. Within each teaching group, the teachers interacted with students in a similar manner. Differences in problem solving styles seems to have resulted in the two teaching groups emphasizing significantly different types of questions. This data suggests that there is an interaction between teacher problem solving styles and student groups on the two question variables.

Teacher Problem Solving Styles and Teacher Pupil Interactions

Differences in teachers' classroom interaction patterns were also analyzed with specific groups of students who were perceived by their teachers to differ in ability. It was believed that teachers with a rigid problem solving style would show a specific pattern of behavior with students of different abilities. It was also thought that teachers with a flexible problem solving style would be more diversified in their student interactions. Differences in teacher student interactions with specific groups of students could then be interpreted as suggesting differences in susceptibility to the expectancy phenomenon.

To test this, information from the Dyadic Rating Scale was analyzed by performing t-tests on the means derived from each of the six variables from each of the three student groups in each of the two teaching conditions. The data was analyzed in terms of the raw scores, the percent variable, the percent group, and the percent total. From this analysis (Tables 6 & 7), it is apparent that teachers with a rigid problem solving style did show some significantly different patterns of behavior with students of different abilities while teachers with a flexible problem solving style did not. No other variable (aside from the level of the question asked) was found to significantly affect the teacher student classroom interaction.

Table 6

Summary of t-test Results of Rigid and Flexible Problem Solving Teachers' Classroom Interactions with High, Middle and Low Functioning Students

Analysis	Variable	Student Group	Rigid Problem Solvers Mean	Rigid Problem Solvers S.D.	Flexible Problem Solvers Mean	Flexible Problem Solvers S.D.	t-Value	Probability
Raw Data	Elaborate Questions	Middle Group	6.83	6.11	.83	.98	2.37	.039
Raw Data	Elaborate Questions	Total	21.20	14.41	4.90	3.90	2.46	.040
Percent Variable	Elaborate Questions	Middle Group	36.06	12.35	13.71	13.00	2.79	.024
Percent Data	Elaborate Questions	High Group	7.99	6.50	1.72	1.13	2.33	.042
Percent Data	Elaborate Questions	Middle Group	6.26	4.54	.89	.98	2.83	.018
Percent Data	Elaborate Questions	Middle Group	2.40	.98	.27	.30	2.61	.026
Percent a	Simple Questions	Low Group	8.37	1.30	10.33	1.38	-2.52	.030

Table 7

Summary of t-test Results of Rigid and Flexible Problem Solving Teachers' Classroom Interactional Patterns with High, Middle and Low Functioning Students Approaching Significance

Analysis	Variable	Student Group	Rigid Problem Solvers Mean	S.D.	Flexible Problem Solvers Mean	S.D.	t-Value	Probability
Raw Data	Elaborate Questions	High	7.00	5.66	1.67	1.75	2.21	.052
Percent Group	Simple Questions	High	23.98	6.60	30.21	2.27	-2.19	.053
Percent Group	Simple Questions	Low	28.09	2.44	30.68	1.58	-2.17	.055
Percent Total	Elaborate Questions	High	2.63	2.31	.56	.42	2.17	.056

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Discussion

This study explored the relationship between problem solving style and teacher-student interactions with the assumption that such a relationship would illustrate susceptibility to the expectancy phenomenon. Since it was found that differences in teachers' classroom behaviors were related to differences in their problem solving styles, this study suggests that susceptibility to the expectancy phenomenon could be influenced by the individual's problem solving behavior.

Problem Solving Style

As a result of their performance on the shift task, subjects in this study were classifiable as being either rigid or flexible problem solvers. The term "rigid" or "flexible" reflected differences in the subject's ability to shift from a higher to a more concrete conceptual level.

The finding from the conceptual shift experiment suggests that in order to solve the shift problem, the individual must first recognize the most relevant common similarity (or the most relevant difference) in order to change their understanding of the problem. Then the individual must apply their new understanding of the problem to derive an appropriate and correct solution. In spite of the feedback given for their responses, six subjects in this study were unable to alter their conceptual behavior.

Teacher Classroom Behavior

The analysis of variance showed that teachers with a rigid problem solving style spent a significantly greater percentage of each student group's (percent group analysis) interactions on the elaborate question variable. These same teachers also spent a significantly greater percentage of their total classroom interactions (percent total analysis) in asking these kinds of questions. On the other hand, the flexible problem solving teachers spent a greater percentage of their interactions with students (when analyzed separately for each group or as a function of the distribution of their total classroom interactions) by asking a greater percentage of simple (factual) questions. No other variable was found to be significantly different between the two types of teachers.

However, from the difference in teacher classroom behavior, it appears that the rigid problem solving teachers ask a greater percentage of higher level or thought provoking questions. Whereas the flexible problem solvers ask a greater percentage of easier questions. It has been written elsewhere (Brophy 1980) that students require a very high success rate in order to

maximize on their capacity to learn. Classrooms which emphasize learning at a rate which almost guarantees success (90 to 100% success - Brophy, 1980) produce more successful students than classes in which teachers tolerate a higher level of failure and frustration. Hence student achievement and learning may be facilitated in the flexible problem solver's classes in which there is a greater emphasis on answering simple, factual questions. In the rigid problem solver's classes, all students spend a greater percentage of their total time in answering more difficult questions. This may constitute a more difficult learning environment for the less able student to participate, and achieve success in. In fact, the analysis of variance suggests that this is indeed what happens since the low functioning students receive less of the total percent of approval interaction, have a greater percentage (as a group) of teacher disapproval interaction and receive less of the teacher's total percentage of approval interactions.

Although other differences were found in teacher classroom behaviors which were not statistically significant, small differences in teacher behavior should not be dismissed as unimportant. Even a difference of 5% in teacher outcomes is important when compounded by all the years a child spends in school (Brophy 1982). In fact, when dealing with self-fulfilling effects, one is dealing with a phenomenon that may affect student achievement in the average of 5% (Brophy 1982). Interestingly enough, a nearly 5% difference in teacher questioning behavior (Tables 8 & 9) was found by this experiment. When the percent totals for each question were compared by teacher type, a near 5% difference was found. When the percentage of a type of question asked to each of the three student groups was summed and averaged and compared by teacher type, again a nearly 5% difference in behavior was found. The two kinds of teachers emphasized significantly different types of questions that could either inhibit or facilitate successful learning for all students in their classes. As a result of differences in problem solving styles, these teachers emphasized different questions which in turn could have important effects in subsequent student classroom behavior. The student's ability to respond to each type of teacher's questions could therefore influence a teacher's perception of that student's ability to meet the teacher's expectations.

Teacher Susceptibility to the Expectancy Phenomenon

This experiment also found that teachers described as rigid problem solvers had differential pupil interactions that were related to their expectations for their students. Since it was found that their classroom interactional patterns were consistent with their expectations as suggested by Foster (1976). These teachers' behavior was interpreted as possibly suggesting that they would be more susceptible to the expectancy phenomenon.

TABLE 8

Percent Difference Table: Difference in the Average of the Distribution within Each Student Group for Each Variable Between the Two Types of Teachers (Percent Group Analysis)

Variable	Rigid Problem Solving Teachers	Flexible Problem Solving Teachers	% Difference
Afforded	32.02	31.40	- .62
Simple	25.86	30.10	-4.14
Elaborate	6.06	1.31	4.75
Approval	21.71	21.23	.48
Disapproval	.85	1.27	- .42
Other	13.41	14.69	-1.28

TABLE 9

Percent Difference Table: Differences in Percent of Interactions Spent with Each Student Group for Each Variable (Percent Total Analysis)

Variable	Rigid Problem Solving Teachers	Flexible Problem Solving Teachers	% Difference
Afforded	31.90	31.42	.48
Simple	25.73	30.09	-4.36
Elaborate	6.18	1.32	4.86
Approval	21.76	21.36	.40
Disapproval	2.03	1.16	- .87
Other	12.39	14.66	-2.27

The observation that susceptability to the expectancy phenomenon is related to problem solving behavior is consistent with existing literature on this topic. The expectations of the rigid problem solving groups do seem to serve as guides (Finn, 1972), and predictors (Jones, 1977), of their behavior. As previously suggested (Mischel, 1977), the classroom behavior of the rigid problem solving teachers seems to indicate that they act on more narrowly defined categories of acceptable behavior for their students. These teachers might try to shape the behavior of selected students in terms of the desired outcome (Bandura, 1978). Problem solving style might possibly power the tenacity of their expectations.

The more limited susceptibility of the flexible problem solving teachers implies these teachers may be better able to alter their behaviors and change their expectations. This may suggest that their initial and dispositional expectations (Jones, 1977), are subject to change. The behavior of these teachers would also seem to indicate that they may use more open categories (Mischel, 1977), in predicting the students' abilities to meet their expectations.

Additionally, this study helps to expand current experimental knowledge about a possible correlate of teacher susceptibilty to the expectancy phenomenon. Though only a limited sample was observed, difference in problem solving style resulted in a different pattern of questioning behavior that was significantly related to perceived differences in student abilities.

In the classes of teachers described as rigid problem solvers, the students perceived to be more able (the high and middle student gruop) have a significantly different pattern of interaction that was not found in the classes of teachers described as having a flexible problem solving style. In the rigid problem solving teachers' classes, it is the better functioning students that have a greater percentage of the interaction in which more difficult questions are asked. It would seem that in these classes, the less able students may have less expected of them. Whereas in the flexible problem solver's classes, it is the students perceived by their teacher's own set of characteristics to be less able that have a significantly different pattern of teacher pupil interaction that is not characteristic of the teacher's interaction with the more able students. It is the type of pupil-teacher interaction as found in the flexible problem solver's classes that might be most beneficial to subsequent student achievement as a result of the type of question asked. Furthermore, it is interesting that this significance occurred in the percent total analysis since this indicates that the flexible problem solvers spend a greater percentage of the total classroom interaction in working with the lower functioning students than their rigid problem solving counterparts.

It would seem that in the classes of the rigid problem solving teachers, more is expected from the better able students while more seems to be expected from the less able students in the flexible problem solver's classes. One seems to get the impression that as a result of differences in problem solving style, the teachers differ in their approach to teaching. The rigid problem solving teachers emphasize questions which the better students can master. They interact with the better students in a way that is consistent with their expectations. This would seem to make this type of teacher more susceptible to demonstrating an expectancy effect. The flexible problem solvers acted in an inverse manner to perceived student differences while stressing an interactional pattern that could maximize student learning and success. These teachers would seem to be less susceptible in demonstrating an expectancy effect. This is also echoed in Tables 8 and 9 where it is the teachers with a rigid problem solving style whose behavior approaches the 5% figure for the average appearance of expectancy effects as suggested by Brophy (1982).

The results from the present research lend support to the Golem and Galetea hypothesis as suggested by Babad, Inbar and Rosenthal, 1982. Teachers described as having a rigid problem solving style could be described as falling under the Golem hypothesis. In their case, the error is not one of commission (in the sense that these teachers actively do something to inhibit the low students' classroom participation. Rather, their error appears to be one of omission. It would seem that while stressing the better able students' performance in their classes that these teachers may not do enough to encourage the less able students to perform better.

The behavior of the flexible problem solving teachers suggests that their behavior conforms to the Galetea hypothesis (Babad, Inbar and Rosenthal, 1982). These teachers appear to act positively in their expectation to encourage and maximize the ability of their less able students. They appear to be able to perceive differences in student ability and might be better at altering their behavior in the classroom to meet the need of their students. Differences in problem solving ability would be interpreted as suggesting that a teacher maintains classroom behaviors which students must respond to regardless of ability (rigid problem solvers) or in altering their behavior to meet the perceived differences in student abilities (flexible problem solvers). The rigid problem solver may expect the student to change his behavior to meet their teacher's expectations while the flexible problem solver may change their behavior to meet the student's needs. It is in maintaining a standard which only the better students can meet that the rigid teacher may be more susceptible to demonstrating an expectancy effect. This would not be true of the flexible problem solver and they would be less

likely to demonstrate this behavior. Susceptibility to the expectancy phenomenon may be therefore related to the ability (or inability) of the teacher to alter their behavior to match their students' needs.

Summary

The purpose of this study was to examine how differences in teacher conceptual style affected their classroom interactions with their students. Based on Elkind's conceptual shift experiments (1966), twelve teachers were asked to discover a relationship between twelve pairs of words and pictures. The expected relationship could only be found by changing an initial conceptual set. Teachers were also asked to record characteristics looked for in successful students, and ranked their students by these criteria. This ranking enabled two observers to record teacher-pupil classroom interactions with the Brophy and Good dyadic rating scale.

The results indicated that the classroom behaviors of teachers were related to their problem solving style. Teachers with a rigid problem solving style had pupil interactions that showed a relationship to perceived differences in student abilities while teachers with a flexible problem solving style demonstrated that their interactions with pupils were less affected by perceived differences in student abilities. These results suggest that differences in problem solving styles can be interpreted as a correlate to differences in teacher susceptibility to the expectancy phenomenon.

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